

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Express Mail mailing label no. EJ450234830US  
Deposited May 21, 2001

USA Patent Application  
Jürgen ADAMS  
COMBINATION INSTRUMENT  
FOR A MOTOR VEHICLE

Priority: German Patent Application  
100 26 892.7 filed May 30, 2000

Hon. Commissioner of Patents and Trademarks  
Washington, D.C. 20231

S I R :

PRELIMINARY AMENDMENT

Please amend this application simultaneously with filing as  
follows:

IN THE ABSTRACT

UNNUMBERED PAGE 15

Please cancel the original Abstract of the Disclosure and  
substitute the Abstract of the Disclosure provide on a separate  
sheet herewith attached.

IN THE SPECIFICATION

PAGE 1

Line 4, before this line, after the title, insert the following  
paragraph heading:

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--FIELD AND BACKGROUND OF THE INVENTION--

PAGE 2

Line 7, before this line insert the following paragraph heading:

--SUMMARY OF THE INVENTION--

Paragraph starting at line 16, please cancel the original paragraph and substitute the following paragraph:

The object is achieved by means of the features of the present invention. The solution is featured by a light-guiding plate provided in the combination instrument,

- into which ambient light is injected from inside or from outside the motor vehicle,
- in which the injected ambient light is guided by means of total reflection at the side of the LC display facing away from the viewer, and
- which has, at the side of the LC display facing away from the viewer, a coating or a structure for extracting the ambient light out of the light-guiding plate there and for injecting the ambient light into the LC display.

Further solution features are

- that the LC display is of transmissive design,
- that the light-guiding plate is composed of plastic,
- that the coating of the light-guiding plate is white and highly reflective,

- that analog display devices with scales are also provided in the combination instrument, and that the light-guiding plate has a structure or coating which is suitable for the selective extraction of light both in the region of the scales for their divisions and/or division indications, and in the region of the display face of the LC display,
- that a photosensor is provided which, without being directly influenced by the ambient light, simply senses the intensity of the light present in the light-guiding plate, that, furthermore, LEDs are provided which inject their light into the light-guiding plate and that the intensity of the light emitted by the LEDs is controlled as a function of the light sensed by the photosensor,
- that the LEDs used in conjunction with the photosensor emit white light for a transition from daylight operation to night-time operation which is as neutrally colored as possible,
- that the light-guiding plate extends out of the housing of the combination instrument up to the windshield of the motor vehicle, as a result of which light which is incident into the motor vehicle through the windshield can be injected into the light-guiding plate with minimum possible obstruction,
- that the light-guiding plate which extends out of the housing of the combination instrument is embedded in the dashboard of the motor vehicle, and the dashboard has, in the region in front of the windshield, an opening for the injection of the ambient light into the light-guiding plate,

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- that the light-guiding plate is provided in the region in front of the windshield with suitable structures or a coating which reduces the refractive index, said structures or coating promoting the injection of the ambient light into the light-guiding plate.

PAGE 4

Line 28, before this line insert the following paragraph heading:

--BRIEF DESCRIPTION OF THE DRAWINGS--

PAGE 5

Line 1, before this line insert the following paragraph heading:

--DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT--

IN THE CLAIMS

(APPLICATION PAGES 12-14)

Line 1, delete "Combination instrument for a motor vehicle"

Before claim 1, change "Patent claims" to --I CLAIM--

Please cancel claims 1-10 without prejudice or disclaimer of the subject matter therein and substitute claims 11-22 therefor:

11. (new) Combination instrument for a motor vehicle having an LC display (1), wherein a light-guiding plate (4) is provided, into said light-guiding plate (4) ambient light is injected from inside or from outside the motor vehicle, in said light-guiding plate (4) the injected ambient light is guided by total reflection at a side of the LC display (1) facing away from a viewer, and said light-guiding plate (4) at the side of the LC display (1) facing away from the viewer has a coating (11) or a structure (13) for extracting the ambient light out of the light-guiding plate (4) and for injecting the ambient light into the LC display (1).

12. (new) The combination instrument according to claim 11, wherein the LC display (1) is transmissive.

13. (new) The combination instrument according to claim 11, wherein the light-guiding plate (4) is composed of plastic.

14. (new) The combination instrument according to claim 11, wherein the coating (11) of the light-guiding plate (4) is white and highly reflective.

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15. (new) The combination instrument according to claim 11, wherein analog display devices with scales (21, 22) are provided, and the light-guiding plate (4) has the structure (13) or the coating (11) which is suitable for selective extraction of light both in a region of the scales (21, 22) for divisions or division indications of the scales, and in a region of a display face of the LC display (1).

16. (new) The combination instrument according to claim 11, wherein a photosensor (12) is provided to sense intensity of the light present in the light-guiding plate (4) without being directly influenced by the ambient light, LEDs (4, 15) are provided to inject light into the light-guiding plate (4), and the intensity of the light emitted by the LEDs (4, 15) is controlled as a function of the light sensed by the photosensor (12).

17. (new) The combination instrument according to claim 16, wherein the LEDs (4, 15) emit white light for a neutrally colored transition from daylight operation to night-time operation.

18. (new) The combination instrument according to claim 11, wherein the light-guiding plate (4) extends out of a housing (23) of the combination instrument to a windshield (24) of the motor vehicle in order to inject into the light-guiding plate (4) the light which is incident into the motor vehicle through the windshield (24).

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19. (new) The combination instrument according to claim 18, wherein the light-guiding plate (4) extending out of the housing (23) of the combination instrument is embedded in a dashboard of the motor vehicle, and the dashboard in a region in front of the windshield (24) has an opening for the injection of the ambient light into the light-guiding plate (4).

20. (new) The combination instrument according to claim 17, wherein the light-guiding plate (4) is provided in the region in front of a windshield (24) of the vehicle with structures (29) or a coating (30) which reduces a refractive index, said structures (29) or said coating (30) promoting the injection of the ambient light into the light-guiding plate (4).

21. (new) The combination instrument according to claim 18, wherein the light-guiding plate (4) is provided in the region in front of the windshield (24) with structures (29) or a coating (30) which reduces a refractive index, said structures (29) or said coating (30) promoting the injection of the ambient light into the light-guiding plate (4).

22. (new) The combination instrument according to claim 11, wherein the motor vehicle is a utility vehicle or a bus.

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Marked-UP version of Spec Paragraph page 2, line 16

The object is achieved by means of the features of the [first claim] present invention. [The dependent claims indicate advantageous embodiments and developments of the solution found.] The solution is [characterized in particular by the fact that in the combination instrument] featured by a light-guiding plate [is] provided in the combination instrument,

- into which ambient light is injected from inside or from outside the motor vehicle,
- in which the injected ambient light is guided by means of total reflection at the side of the LC display facing away from the viewer, and
- which has, at the side of the LC display facing away from the viewer, a coating or a structure for extracting the ambient light out of the light-guiding plate there and for injecting the ambient light into the LC display.

Further solution features are

- that the LC display is of transmissive design,
- that the light-guiding plate is composed of plastic,
- that the coating of the light-guiding plate is white and highly reflective,



- that analog display devices with scales are also provided in the combination instrument, and that the light-guiding plate has a structure or coating which is suitable for the selective extraction of light both in the region of the scales for their divisions and/or division indications, and in the region of the display face of the LC display,
- that a photosensor is provided which, without being directly influenced by the ambient light, simply senses the intensity of the light present in the light-guiding plate, that, furthermore, LEDs are provided which inject their light into the light-guiding plate and that the intensity of the light emitted by the LEDs is controlled as a function of the light sensed by the photosensor,
- that the LEDs used in conjunction with the photosensor emit white light for a transition from daylight operation to night-time operation which is as neutrally colored as possible,
- that the light-guiding plate extends out of the housing of the combination instrument up to the windshield of the motor vehicle, as a result of which light which is incident into the motor vehicle through the windshield can be injected into the light-guiding plate with minimum possible obstruction,
- that the light-guiding plate which extends out of the housing of the combination instrument is embedded in the dashboard of the motor vehicle, and the dashboard has, in the region in front of the windshield, an opening for the

injection of the ambient light into the light-guiding plate,

- that the light-guiding plate is provided in the region in front of the windshield with suitable structures or a coating which reduces the refractive index, said structures or coating promoting the injection of the ambient light into the light-guiding plate.

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**Combination instrument for a motor vehicle**

**ABSTRACT OF THE DISCLOSURE**

In a combination instrument for a motor vehicle, in particular for a utility vehicle or a bus, having an LC display (1), a light-guiding plate (4) is provided, into which ambient light is injected from inside or from outside the motor vehicle, in which the injected ambient light is guided by total reflection at the side of the LC display (1) facing away from the viewer and which has, at the side of the LC display (1) facing away from the viewer, a coating (11) or a structure (13) for extracting the ambient light out of the light-guiding plate (4) there and for injecting the ambient light into the LC display (1). This measure backlights the LC display (1), leading to a significant increase in the contrast for information displayed on the LC display (1).

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